

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>				1. CONTRACT ID CODE <b>J</b>		PAGE OF PAGES <b>1   33</b>	
2. AMENDMENT/MODIFICATION NO. <b>0001</b>		3. EFFECTIVE DATE <b>17-Dec-2006</b>		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable)	
6. ISSUED BY AFGHANISTAN ENGINEER DISTRICT US ARMY CORPS OF ENGINEERS KABUL APO AE 09356		CODE <b>W917PM</b>		7. ADMINISTERED BY (If other than item 6)  <b>See Item 6</b>		CODE	
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)				X		9A. AMENDMENT OF SOLICITATION NO. <b>W917PM-07-R-0008</b>	
				X		9B. DATED (SEE ITEM 11) <b>25-Nov-2006</b>	
						10A. MOD. OF CONTRACT/ORDER NO.	
						10B. DATED (SEE ITEM 13)	
CODE		FACILITY CODE					
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>							
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> is not extended. Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required)							
<b>13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.</b> <b>IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>							
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.							
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).							
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:							
D. OTHER (Specify type of modification and authority)							
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)  This Request for Proposals (RFP) is hereby cancelled.  For archive purposes, this RFP is amended in the following pages in response to prospective offeror questions and comments. Changes are made in this RFP amendment for the purpose of making it a more correct and complete document.  The Request for Proposals is canceled notwithstanding the other changes made in this amendment.							
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)			
				TEL: _____ EMAIL: _____			
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
_____ (Signature of person authorized to sign)				BY _____ (Signature of Contracting Officer)		16-Dec-2006	

## SECTION SF 30 BLOCK 14 CONTINUATION PAGE

**SUMMARY OF CHANGES**

## SECTION 00010 - SOLICITATION CONTRACT FORM

The required response date/time 27-Dec-2006 05:00 PM has been deleted.

The offeror acceptance period has decreased by 120 from 120 to 0.

The number of offeror copies required has decreased by 4 from 4 to 0.

## CLIN 0009

The CLIN description has changed from Dining Facility to Dining Facility - DELETED.

The CLIN extended description has changed from Option 1 to Option 1This ITEM NO. is DELETED..

The pricing detail quantity has decreased by 150.00 from 150.00 to 0.00.

The unit of issue Square Meter has been deleted.

## CLIN 0011

The CLIN description has changed from Heating System and Heating Room to Heating System and Room - DELETED.

The CLIN extended description has changed from Option 3 to Option 3This ITEM NO. is DELETED..

The pricing detail quantity has decreased by 1.00 from 1.00 to 0.00.

The unit of issue Lump Sum has been deleted.

## SECTION 00800 - SPECIAL CONTRACT REQUIREMENTS

The following have been modified:

**SECTION 01015****TECHNICAL REQUIREMENTS****1. GENERAL**

**1.1** The Contractor's design and construction must comply with technical requirements contained herein. The Contractor shall provide design and construction using the best blend of cost, construction efficiency, system durability, ease of maintenance and environmental compatibility.

**1.2** These design and product requirements are minimum requirements. The Contractor is encouraged to propose alternate design or products (equipment and material) that are more commonly used in the region; will be equally or more cost effective or allow for more timely completion, but furnish the same system durability, ease of maintenance and environmental compatibility. The Contractor will be required to submit information as requested by the Contracting Officer to make a comparison of the proposed alternate. All variations must be approved by the Contracting Officer.

**1.3 ASBESTOS CONTAINING MATERIALS**

Asbestos containing material (ACM) shall not be used in the design and construction of this project. If no

other material is available which will perform the required function or where the use of other material would be cost prohibitive, a waiver for the use of asbestos containing materials must be obtained from the Contracting Officer.

## **1.4 SAFETY**

### **1.4.1 General Safety Considerations**

General safety considerations applicable to personnel, both essential and non-essential, at project sites where UXO may **not be** encountered include:

- a. Do not carry fire or spark-producing devices.
- b. Do not conduct explosive or explosive-related operations without approved procedures and proper supervision and UXO safety support.
- c. Do not become careless by reason of familiarity with UXO or the reported probability level of UXO contamination.
- d. Do not conduct explosive or potentially explosive operations during inclement weather.
- e. Avoid contact with UXO except during UXO clearance operations.
- f. Conduct UXO-related operations during daylight hours only.
- g. Employ the "buddy system" at all times.

### **1.4.2 Activity Hazard Analysis (AHA) Briefings**

- a. Activity Hazard Analysis's shall be prepared in accordance with the Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1.
- b. Safety requirements (or alternatives) that will either eliminate the identified hazards, mitigate or control them to reduce the associated risks to an acceptable level will be developed. The adequacy of the operational and support procedures that will be implemented to eliminate, control, or abate identified hazards or risks will then be evaluated and a second risk assessment completed to verify that a satisfactory safety level has been achieved.

### **1.4.3 Notification of Noncompliance**

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall make no part of the time lost due to such stop orders the subject of claim for extension of time or for excess costs or damages.

## **1.5 LIMITATION OF WORKING SPACE**

The Contractor shall, except where required for service connections or other special reasons, confine his operations strictly within the boundaries of the site. Workmen will not be permitted to trespass on adjoining property. Any operations or use of space outside the boundaries of the site shall be by arrangement with all interested parties. It must be emphasized that the Contractor must take all practical steps to prevent his workmen from entering adjoining property and in the event of trespass occurring the Contractor will be held entirely responsible.

## 1.6 TEMPORARY STRUCTURES

The Contractor shall erect suitable temporary fences, lighting, and necessary structures to safeguard the site, materials and plant against damage or theft and for the protection of the general public and shall adequately maintain the same throughout the course of the contract.

## 1.7 SUBCONTRACTORS

Compliance with the provisions of this section by subcontractors will be the responsibility of the contractor.

## 1.8 List of Codes and Technical Criteria:

The following codes and technical criteria and those referenced therein shall be required for this project. This list is not exhaustive and is not necessarily complete.

TI 800-01, Design Criteria

TI 800-03 Technical Requirements for Design-Build

TM 5-811-1 Electrical Power Supply and Distribution

AABC - Associated Air Balance Council (National Standards for total System Balance)

Air Force Manual 32-1071, Security Engineering, volumes 1-4, 1 May 1994

American Water Works Association, ANSI/AWWA C651-99 standard

ARI - Air Conditioning and Refrigeration Institute

Army TM 5-853-1, Security Engineering, vols. 1 through 4, 12 May 1994

ASCE 7-02, Minimum Design Loads for Buildings and Other Structures, 2002

ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers

ASME - American Society for Mechanical Engineering

ASTM - American Society for Testing and Materials

AWS - American Welding Society

EIA ANSI/TIA/EIA-607: (1994) Commercial Building Grounding/Bonding Requirement Standard.

Factory Mutual (FM) Approval Guide-Fire Protection (2002).

IBC - International Building Code (and its referenced codes including those inset below)

IMC – International Mechanical Code

IPC – International Plumbing Code

Lighting Handbook, IESNA, latest edition

Codes and Standards of the National Fire Protection Association (NFPA)

[as applicable and enacted in 2003, unless otherwise noted].

NFPA 10, Portable Fire Extinguishers, 2002 edition

NFPA 70, National Electrical Code, 2005 edition

NFPA 72, National Fire Alarm Code, 2002 edition

NFPA 90A, Air Conditioning and Ventilating Systems, 2002 edition

NFPA 101, Life Safety Code, 2003 edition

SMACNA - Sheet Metal and Air Conditioning Contractors' National Association

International Mine Action Standards, latest edition; see <http://www.mineactionstandards.org> for copy of standards.

UFC 1-200-01, Design: General Building Requirements, 31 July 2002

UFC 3-240-03, Operation and Maintenance: Wastewater Treatment System Augmenting Handbook

UFC 3-600-01, Design: Fire Protection Engineering for Facilities, 16 January 2004

UFC 4-010-01, Design: Minimum DoD Antiterrorism Standards for Buildings, 8 Oct 2003  
UFC 4-010-02, DoD Minimum Antiterrorism Standoff Distances for Buildings, 8 Oct 2003  
Underwriters' Laboratories (UL) Fire Protection Equipment Directory (2002).  
USCINCCENT OPORD 97-1  
UFC 3-520-01 Interior Electrical Systems  
UFC 3-530-01AN Interior and Exterior Lighting and Controls  
UFC 3-550-03FA Electrical Power Supply and Distribution  
UFC 3-540-04N Diesel Electric Generating Plants  
UFC 1-300-09N Design Procedures

The publications to be taken into consideration shall be those of the most recent editions. Standards other than those mentioned above may be accepted if the standards chosen are internationally recognized and meet the minimum requirements of the specified standards. The Contractor shall be prepared to submit proof of this if requested by the Contracting Officer.

## **2. SITE DEVELOPMENT:**

### **2.1 GENERAL**

The project includes furnishing all materials, equipment and labor for constructing water, sanitary sewer and storm sewer service lines, as applicable, and connecting to the existing sewer networks.

### **2.2 ENVIRONMENTAL PROTECTION**

#### **2.2.1 Applicable Regulations**

The Contractor shall comply with all Host Nation laws, rules, regulations or standards concerning environmental pollution control and abatement with regard to discharge of liquid waste into natural streams or manmade channels. The contractor shall review host nation and U.S. Government environmental regulations with the contracting officer prior to design and discharge of any liquid wastes into natural streams or manmade channels. **The contractor shall obtain all necessary permits to complete this project.**

#### **2.2.2 Notification**

The Contracting Officer will notify the Contractor in writing of any observed non-compliance with the foregoing provisions. The Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No extension of time or damages will be awarded to the Contractor unless it was later determined that the Contractor was in compliance.

#### **2.2.3 Spillages**

Measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, herbicides and insecticides, and construction materials from polluting the construction site and surrounding area.

#### **2.2.4 Disposal**

Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., shall be taken to a

dumpsite off site and subject to the approval of the Contracting Officer. Burning at the project site for the disposal of refuse and debris will not be permitted.

## **2.3 CIVIL SITE DEVELOPMENT**

The site plan shall show geometric design of the site, including applicable dimensions of all exterior facilities, mechanical equipment, pavements, utilities, etc. Required facilities are described in the following sections of this specification. All roads and areas where tractor-trailer vehicles will travel shall be designed for the worst case turning radius. Design and construction of roads and pavements shall be based on recommendations from geotechnical investigation required herein.

### **2.3.1 Grading, Drainage, and Landscaping**

**Grading:** The contractor will provide all necessary sites grading to insure adequate drainage so that no areas will be flooded due to a rainfall of a 10-year frequency.

**Drainage:** The area should be compatible with the existing terrain. All new facilities will be a minimum of 0.25 meters above finished grades.

**Landscaping:** The contractor shall perform site works up to 6 meters out from all facilities listed herein for landscaping including clearing, grubbing, and grading. Planting is not required.

### **2.3.2 Paving**

#### **2.3.2.1 Roads**

Paved roads are required within the base camp area. All pre-existing conditions are undeveloped land with gentle slopes, without substantial vegetation and with natural drainage channels of moderate size and spacing that are dry most of the time. All roads shall be of wearing surface 7.3 meters (24 feet) wide, unless otherwise noted, graded for proper drainage, provided with necessary drainage structures and completed with prescribed surfaces in accordance with applicable sections of TM 5-822-2 and TM 5-822-5 standards. The compound (cantonment area) roads sections shall have 200 mm (8 inch) compacted base course minimum and shall be surfaced with minimum 50 mm (2 inch) hot mix asphalt concrete, unless otherwise noted. Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires major drainage structures or bridges. Also, the Contracting Officer shall be immediately notified if the required lengths of road or preexisting conditions are determined to be substantially or materially different than the above-described conditions/estimates.

#### **2.3.2.2 Grading Plan (New facility only)**

Preliminary investigation indicates no need for bridges or major drainage structures. The Contractor shall notify the Contracting Officer immediately if initial site survey determines that area hydrology requires major drainage structures or bridges. The contractor shall design a site grading plan that provides positive drainage and minimizes the requirement for major structures in a cost effective manner.

#### **2.3.2.3 Parking Areas**

Contractor shall construct parking areas using asphalt concrete surface. Subgrade shall be 150mm (6 inches) minimum in depth scarified and compacted to 95% proctor density. Aggregate base shall be 150mm (6 inches). Aggregate Base Course (ABC) material must be well graded, durable aggregate

uniformly moistened and mechanically stabilized by compaction. Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 or equivalent DIN, BS, or EN standards.

### **2.3.3 CIVIL UTILITIES**

#### **2.3.1.1 General**

The design of the water and sanitary systems shall be sized to provide flow and discharge based on a fixture unit basis. The design drawings shall show all utility lines, line sizes, valves, manholes, disinfection systems, and applicable details associated with water and sanitary system designs. Specifications covering water lines, valves, pumps, controls, and sanitary sewers shall be submitted as part of the design and shall require standard materials that are available in-country. Contractor shall install and connect exterior sanitary sewer collection and water supply piping to service connection points of each facility requiring such.

#### **2.3.1.2 WATER**

##### **2.3.1.2.1 General**

Infrastructure design and construction shall serve the demand. The Contractor shall install water laterals, lines and service connections to include all pipe, valves, fittings and appurtenances. Exterior water line construction shall include service to all buildings **as described in the Scope of Work Section 01010**. The required Average Daily Demand (ADD) approximation is derived from 155 liters per capita per day (lpcd). In the event potable or non-potable use water is required prior to completion of the water facilities infrastructure the Contractor may be issued a Request for Proposal to provide non-potable (tank truck) and potable (bottled or other reliable source) consumption. Provide a minimum of one (1) outside water hydrant (hose spigot) for any building or facility for which a water supply is provided for landscaping purposes.

#### **2.3.1.3 WATER DISTRIBUTION SYSTEM**

##### **2.3.1.3.1 General**

The Contractor shall provide a water distribution system described as follows: Pipe diameters used in the network shall be 300mm (12 inch), 250mm (10 inch), 200mm (8 inch), 150mm (6 inch) and 100mm (4 inch), as calculated, using ductile iron (DI) conforming to AWWA C151, installed in accordance with C 600 or polyvinyl chloride (PVC) as per ASTM D 1784 and 1785. All pipes and joints shall be capable of at least 1.03 Mpa (150 psi) and 1.38 (200psi) hydrostatic test pressure unless otherwise specified. Pipes should be adequate to carry the maximum quantity of water at acceptable velocities 0.9 to 1.5m/sec (3 to 5 ft/sec ) at maximum flows not to exceed 2.8m/sec (9.2ft/sec) with working pressures of 240kPa (35psi) to 350kPa (50psi). Minimum pressure is 140kPa (20psi) to all points of the distribution system and maximum pressure of 690kPa (75psi). If high pressures (greater than 690kPa) cannot be avoided, pressure-reducing valves shall be used. Water service connections to buildings shall vary from 19mm, 25mm or 38mm to 75mm, as calculated, depending on the usage requirement. Pipe service connections from the distribution main to the building shall be either Polyvinyl Chloride (PVC) plastic Schedule 80 ASTM D 1785 or copper tubing conforming to ASTM B 88M, Type K, annealed. After choosing piping material type, use similar piping materials for all buildings for efficiency of future maintenance activities. The distribution network shall be laid out in a combination grid and looped pattern with dead ends not exceeding 30m (99 feet). Dead end sections shall not be less than 150mm (6 inch) diameter and shall

either have blow off valves or fire hydrants (flushing valves) installed for periodic flushing of the line. Any pipe with a fire hydrant on the line shall be at least 150mm (6 inch) in diameter. Water supply distribution shall connect to a building service at a point approximately 1.5m (5 feet) outside the building or structure to which the service is required. Adequate cover must be provided for frost protection. A minimum cover of 800mm (2'-8") is required to protect the water distribution system against freezing. Water lines less than 1.25 meters (4 feet) deep under road crossings shall have a reinforced concrete cover of at least 150 mm (6 inch) thickness around the pipe.

#### **2.3.1.3.2 Pipe**

The Contractor shall provide pipe of adequate strength, durability and be corrosion resistant with no adverse effect on water quality. The exterior surface of the pipe must be corrosion resistant. If the pipe is installed underground pipe shall be encased with polyethylene in accordance with AWWA C105. Water distribution pipe material shall be PVC or Ductile Iron (DI). Ductile iron pipe shall conform to AWWA C104, etal. DI fittings shall be suitable for 1.03MPa (150psi) pressure unless otherwise specified. Fittings for mechanical joint pipe shall conform to AWWA C110. Fittings for use with push-on joint pipe shall conform to AWWA C110 and C111. Fittings and specials shall be cement mortar lined (standard thickness) in accordance with C104. Polyvinyl Chloride (PVC) pipe shall conform to ASTM D 1785. Plastic pipe coupling and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. PVC screw joint shall be in accordance with ASTM D 1785, etal, Schedules 40, 80 and 120. PVC pipe couplings and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B. Pipe less than 80mm (3 inch) , screw joint, shall conform to dimensional requirements of ASTM D schedule 80. Elastomeric gasket-joint, shall conform to dimensional requirements of ASTM D 1785 Schedule 40, All pipe and joints shall be capable of 1.03 Mpa (150psi) working pressure and 1.38 Mpa (200psi) hydrostatic test pressure.

#### **2.3.1.3.3 Hydrostatic, Leakage and Disinfection Tests**

The Contracting Officer will be notified not less than 48 hours in advance of any water piping test and will be given full access for monitoring testing procedures and results. Where any section of water line is provided with concrete thrust blocking for fittings or hydrants tests shall not be made until at least 5 days after installation of the concrete thrust blocking, unless otherwise approved.

#### **2.3.1.3.4 Pressure Test**

After the pipe is laid, the joints completed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of piping shall, unless otherwise specified, be subjected for 1 hour to a hydrostatic pressure test of 1.03 MPa (150 psi). Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, hydrants and valves shall be carefully examined during the partially opened trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, hydrants and valves discovered following this pressure test shall be removed and replaced and retested until the test results are satisfactory.

#### **2.3.1.3.5 Leakage Test**

Leakage test shall be conducted after the pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours and during the test the water line shall be subjected to not less than 1.03 MPa (150psi). Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section, necessary to maintain pressure to within 34.5kPa (5 psi) of the



specified leakage test pressure after the pipe has been filled with water and the air expelled. Pipe installation will not be accepted if leakage exceeds the allowable leakage, which is determined by the following formula:

$L = 0.0001351ND (P \text{ raised to } 0.5 \text{ power})$  L = Allowable leakage in gallons per hour N = Number of joints in the length of pipeline tested D = Nominal diameter of the pipe in inches P = Average test pressure during the leakage test, in psi gauge

Should any test of pipe disclose leakage greater than that calculated by the above formula, the defective joints shall be located and repaired until the leakage is within the specified allowance, without additional cost to the government.

### **2.3.1.3.6 Bacteriological Disinfection**

#### **2.3.1.3.6.1 Disinfection Procedure**

Before acceptance of potable water operation, each unit of completed waterline shall be disinfected as prescribed by AWWA C651. After pressure tests have been completed, the unit to be disinfected shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. Flushing will be performed in a manner and sequence that will prevent recontamination of pipe that has previously been disinfected. The chlorinating material shall be liquid chlorine, calcium hypochlorite, or sodium hypochlorite. The chlorinating material shall provide a dosage of not less than 50 ppm and shall be introduced into the water lines in an approved manner. Polyvinyl Chloride (PVC) pipelines shall be chlorinated using only the above-specified chlorinating material in solution. The agent shall not be introduced into the line in a dry solid state. The treated water shall be retained in the pipe long enough to destroy all non-spore forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 25 ppm of free chlorine residual throughout the line at the end of the retention period. Valves on the lines being disinfected shall be opened and closed several times during the contact period. The line shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm. During the flushing period, each fire hydrant on the line shall be opened and closed several times.

#### **2.3.1.3.6.2 Sampling**

For each building connected to the water system, personnel from the Contractor's commercial laboratory shall take at least 3 water samples from different points, approved by the Contracting Officer, in proper sterilized containers and perform a bacterial examination in accordance with approved methods. The commercial laboratory shall be verified to be qualified by the appropriate authority for examination of potable water.

#### **2.3.1.3.6.3 Acceptance Requirements**

The disinfection shall be repeated until tests indicate the absence of pollution for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained.

#### **2.3.1.3.7 Time for Making Tests**

Except for joint material setting or where concrete thrust blocks necessitate a 5-day delay, pipeline jointed with rubber gaskets, mechanical or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected and tested for leakage at any time after partial completion of backfill.

#### **2.3.1.3.8 Concurrent Tests**

The Contractor may elect to conduct the hydrostatic tests using either or both of the following procedures.

Regardless of the sequence of tests employed, the results of pressure tests, leakage tests, and disinfection shall be recorded for submission and approval. Replacement, repair or retesting required shall be accomplished by the Contractor at no additional cost to the Government. a. Pressure test and leakage test may be conducted concurrently, b. Hydrostatic tests and disinfection may be conducted concurrently, using water treated for disinfection to accomplish the hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be re-accomplished.

#### **2.3.1.3.9 Valves**

Valves (Gate valves w/box) shall be placed at all pipe network tee and cross intersections and the number of valves shall be one less than the number of lines leading into and away from the intersection. For isolation purposes valves shall be spaced not to exceed 3600 mm (12 feet). Gate valves shall be in accordance with AWWA C 500 and/or C509. Butterfly valves (rubber seated) shall be in accordance with C504 etal. The valves and valve boxes shall be constructed to allow a normal valve key to be readily used to open or close the valve. Provide traffic-rated valve boxes. Provide concrete pad, 1 meter (3'-4") square, for all valve boxes.

#### **2.3.1.3.10 Vacuum and Air Release Valves**

Air release valves are required to evacuate air from the main high points in the line when it is filled with water, and to allow the discharge of air accumulated under pressure. Vacuum relief valves are needed to permit air to enter a line when it is being emptied of water or subjected to vacuum. Contractor shall submit manufacturer's data for properly sized combination air and vacuum release valves and determine their locations on the distribution system subject to review and approval of the Contracting Officer.

#### **2.3.1.3.11 Blow-off valves**

The Contractor shall provide 40-50mm (1-5/8" – 2") blow-off valves at ends of dead end mains. Valves should be installed at low points in the mains where the flushing water can be readily discharged to natural or manmade drainage ditches, swales or other.

#### **2.3.1.3.12 Thrust Blocking**

Contractor shall provide concrete thrust blocking at any point where the layout of the system changes the direction of the flow, increases the velocity, or decreases or stops the flow. At these points, the pipes and fittings must be anchored and kept from moving or pulling apart by the use of thrust blocks installed against undisturbed earth.

### **2.3.1.4 SANITARY SEWER**

#### **2.3.1.4.1 General**

There are no functional or salvageable sanitary sewer collection, treatment or disposal facilities at this site. The Contractor shall obtain topographic information or other maps that show vegetation, drainage channels and other land surface features such as underground utilities and related structures that may

influence the design and layout of the collection system. If maps are not available, or do not provide satisfactory information or sufficient detail of the site, field surveys shall be performed. Sanitary sewers less than 1.25 meters (4 feet) under road crossings shall have reinforced concrete cover at least 150 mm (6 inch) thick around the pipe.

Exterior sanitary sewer line construction shall include service to all buildings as described in the Scope of Work Section 01010. Contractor shall design sanitary sewer collection system using approved field survey data and finished floor elevations. Depending upon the topography and building location, the most practical location of sanitary sewer lines is along one side of the street. In other cases they may be located behind buildings midway between streets. Main collection sewers will follow the most feasible route to the point of discharge. The sewer collection system shall be designed to accommodate the initial occupancy and a reasonable expansion capability. All sewers shall be located outside of the roadways as much as practical, and minimize the number of roadway crossings. To the extent practical, a sewer from one building shall not be constructed under another building, or remain in service where a building is subsequently constructed over it. Construction required shall include appurtenant structures and building sewers to points of connection with building drains 1.5m (5 feet) outside the building to which the sewer collection system is to be connected.

The Contractor shall use the following criteria where possible to provide a layout which is practical, economical and meets hydraulic requirements: 1) Follow slopes of natural topography, 2) avoid routing sewers through areas which require extensive restoration or underground demolition, 3) Avoid areas of high groundwater and placement of sewer below the groundwater table, 4) locate manholes at change in direction, size or slope of gravity sewers, 5) use straight sections between manholes, curved alignment shall not be permitted, 6) locate manholes at intersections of streets where possible, 7) avoid placing manholes where the tops will be submerged or subject to surface water inflow, 8) evaluate alternative sewer routes where applicable, 9) verify that final routing selected is the most cost effective alternative that meets service requirements. In the event that facilities to be provided under the contract must be occupied prior to completion of permanent wastewater infrastructure, the Contractor will be responsible for providing temporary portable shower and bathroom facilities.

#### **2.3.1.4.2 Protection of Water Supplies**

The Contractor shall ensure that the sewer design meets the following criteria:

**2.3.1.4.2.1** Sanitary sewers shall be located no closer than 15m (50 feet) horizontally to water wells or reservoirs to be used for potable water supply.

**2.3.1.4.2.2** Sanitary sewers shall be no closer than 3m (10 feet) horizontally to potable water lines; where the bottom of the water pipe will be at least 300mm (12 inches) above the top of the sanitary sewer, horizontal spacing shall be a minimum of 1.8m (6 feet).

**2.3.1.4.2.3** Sanitary sewers crossing above potable water lines shall be constructed of suitable pressure pipe or fully encased in concrete for a distance of 2.7m (9 feet) on each side of the crossing. Pressure pipe will be as required for force mains in accordance with local standards and shall have no joint closer than 1 meter (3 feet) horizontally to the crossing, unless the joint is encased in concrete.

#### **2.3.1.4.3 Quantity of Wastewater**

The Contractor shall verify the average daily flow considering both resident (full occupancy) and non-resident (8hr per day) population. The average daily flow will represent the total waste volume generated

over a 24-hour period, and shall be based on the total population of the facility and usage rate of 155 liter per capita day (water usage). The wastewater flow rate shall be calculated as approximately 80% of water usage rate. Design criteria guideline shall be based on an average influent wastewater characteristics as BOD of 400mg/l, SS of 400mg/l, BOD load of 750ppd, and SS load of 750ppd.

#### **2.3.1.4.4 Gravity Sewer**

Sanitary sewers shall be designed to flow at 90 to 95 percent full. Sanitary sewer velocities shall be designed to provide a minimum velocity of 0.6 meters per second (mps) or 2.0 feet per second (fps) at the ADD flow rate and a minimum velocity of 0.8 to 1.05 mps (2.5-3.5fps) at the peak diurnal flow rate. In no case shall the velocity drop below 0.3 mps, (1.0 fps) to prevent settlement of organic solids suspended in the wastewater. Pipe slopes shall be sufficient to provide the required minimum velocities and depths of cover on the pipe. Unless otherwise indicated (see Building Connections and Service Lines), gravity sewer pipe shall be installed in straight and true runs in between manholes with constant slope and direction. Adequate cover must be provided for frost protection. A minimum cover of 800 mm (2'-8") will be required to protect the sewer against freezing.

#### **2.3.1.4.5 Manholes**

The Contractor shall provide standard depth manholes (MH), (depth may vary) an inside dimension of 1.2 meters (4 feet). Manholes shall be made of cast-in-place reinforced concrete with reinforced concrete cover. Alternate pre-cast manhole option shall taper to a 750 mm (30-inch) cast iron frame that provides a minimum clear opening of 600 mm (24 inches). In every case, the manholes, frames and covers shall be traffic rated, H-20 load rating. All manholes shall be provided with a concrete bench with a flow line trough, smoothly formed to guide waste flow to the outlet pipe from the inlet pipe(s). The top surface of the bench shall be above the crown of all pipes within the manhole. All surfaces of the bench shall be sloped smoothly toward the trough to guide flow, even under peak flow conditions.

##### **2.3.1.4.5.1 Manhole Design Requirements**

Manholes are required at junctions of gravity sewers and at each change in pipe direction, size or slope, except as noted hereinafter for building connections.

##### **2.3.1.4.5.2 Spacing**

The distance between manholes must not exceed 120 m (400 ft) in sewers of less than 460 mm (18 inches) in diameter. For sewers 460 mm (18 inches) and larger, and for outfalls from wastewater treatment facilities, a spacing of up to 180 m (600 ft) is allowed provided the velocity is sufficient to prevent the sedimentation of solids.

##### **2.3.1.4.5.3 Pipe connections**

The crown of the outlet pipe from a manhole shall be on line with or below the crown of the inlet pipe.

##### **2.3.1.4.5.4 Pipe**

Pipe shall conform to the respective specifications and other requirements as follows: Provide Polyvinyl Vinyl Chloride (PVC) conforming to ASTM D 3034, Type PSM with a maximum SDR of 35, size 380 mm (15inch) or less in diameter. PVC shall be certified as meeting the requirements of ASTM D 1784,

cell Class 12454 B.

#### **2.3.1.4.5.5 Fittings**

Fittings shall be compatible with pipe supplied and shall have a strength not less than that of the pipe. Fittings shall conform to the respective specifications and requirements as follows: provide PVC fittings conforming to ASTM D 3034 for type PSM pipe.

#### **2.3.1.4.5.6 Joints**

Joints installation requirements shall comply with the manufacturers installation instructions. Flexible plastic pipe (PVC or high density polyethylene pipe) gasketed joints shall conform to ASTM D3212.

#### **2.3.1.4.5.7 Branch Connections**

Branch connections shall be made by use of regular fittings or solvent-cemented saddles as approved. Saddles for PVC pipe shall conform to Table 4 of ASTM D 3034.

#### **2.3.1.4.5.8 Frames and Covers**

Frames and covers shall be cast iron, ductile iron or reinforced concrete, traffic rated in any case to an H-20 load rating. Cast iron frames and covers shall be traffic rated, circular with vent holes.

#### **2.3.1.4.5.9 Steps for Manholes**

Steps shall be cast iron, polyethylene coated, at least 15 mm (5/8 inch) thick, not less than 400mm (16 inches) in width, spaced 300 mm (12 inches) on center.

**2.3.1.4.5.10** The minimum depth of cover over the pipe crown shall be 0.8 m (2'-8").

#### **2.3.1.4.6 Building Connections and Service Lines**

Building connections and service lines will be planned to eliminate as many bends as practical and provide convenience in rodding. Bends greater than 45 degrees made with one fitting should be avoided; combinations of elbows such as 45-45 or 30-60 degrees should be used with a cleanout provided. Connections to other sewers will be made directly to the pipe with standard fittings rather than through manholes. However, a manhole must be used if the connection is more than 31m from the building cleanout. Cleanouts shall be provided outside of the building. Service connection lines will be a minimum of 100 mm (4 inch) diameter and laid at a minimum 1% grade, but up to 2% as design parameters dictate. Service laterals shall be 150 mm (6 inch) and sloped to maintain the minimum velocity as described in paragraph "Gravity Sewer."

#### **2.3.1.4.7 Cleanouts**

Cleanouts must be installed on all sewer-building connections to provide a means for inserting cleaning rods into the underground pipe. Install manufactured wye fittings. In lieu of a wye fitting, an inspection chamber may be installed. The inspection chamber shall be of the same construction as a manhole. Preferably the cleanout will be of the same diameter as the building sewer, and never be smaller than 100 mm (4 inch).

#### **2.3.1.4.8 Field Quality Control**

##### **2.3.1.4.8.1 Field Tests and Inspections**

**2.3.1.4.8.2** The Contracting Officer will conduct field inspections and witness field tests specified in this section. The Contractor shall perform field tests and provide labor, equipment and incidentals required for testing.

**2.3.1.4.8.3** Check each straight run of pipeline for gross deficiencies by holding a light in a manhole; it shall show a practically a full circle of light through the pipeline when viewed from the adjoining end of the line. When pressure piping is used in a non-pressure line for non-pressure use, test this piping as specified for non-pressure pipe.

**2.3.1.4.8.4** Test lines for leakage by either infiltration tests or exfiltration tests. Prior to testing for leakage, backfill trench up to at least lower half of the pipe. When necessary to prevent pipeline movement during testing, place additional backfill around pipe to prevent movement during testing, but leaving joints uncovered to permit inspection. When leakage or pressure drop exceeds the allowable amount specified, make satisfactory correction and retest pipeline section in the same manner. Correct visible leaks regardless of leakage test results.

**2.3.1.4.8.5** Infiltration tests and ex-filtration tests: Perform these tests for sewer lines made of specified material, not only concrete, in accordance with ASTM C 969M, ASTM C 969. Make calculations in accordance with the Appendix to ASTM C 969M, ASTM 969.

**2.3.1.4.8.6** Low-pressure air tests: Perform tests as follows: 1) Concrete pipe: Test in accordance with ASTM C 924M, ASTM C 924. Allowable pressure drop shall be given in ASTM C 924M ASTM C 924. Make calculations in accordance with the Appendix to ASTM C 924M, ASTM C 924; 2) Ductile-iron pipe: Test in accordance with the applicable requirements of ASTM C 924M, ASTM C 924. Allowable pressure drop shall be as given in ASTM C 924M, ASTM C 924. Make calculations in accordance with the Appendix to ASTM C 924M, ASTM C 924; 3) PVC Plastic pipe: Test in accordance with applicable requirements of UBPPA UNI-B-6. Allowable pressure drop shall be as given in UBPPA UNI-B-6. Make calculations in accordance with the Appendix to UBPPA UNI-B-6.

##### **2.3.1.4.8.7 Deflection Testing**

Deflection testing will not be required however, field quality control shall ensure that all piping is installed in accordance with deflection requirements established by the manufacturer.

##### **2.3.1.4.8.8 Septic Systems**

Septic systems shall be designed and installed in accordance with UFC 3-240-03.

#### **2.4.1.5 Storm Sewer Systems (N/A)**

Oil/water separators shall be utilized for all drains from industrial sites. Separators shall be installed as close as possible from the drain location. Storm sewer system shall not be mixed with sanitary sewer system and shall be in accordance with UFC 3-240-03.

### **3. GENERAL BUILDING REQUIREMENTS**

### **3.1 Life Safety / Fire Protection / Handicapped Accessibility**

To the extent possible, all facilities will be designed in accordance with recognized industry standards for life safety and building egress. An adequate fire alarm system, fire extinguishers, and smoke alarms shall all be included as required. If a sprinkler system is required by building code, a waiver will have to be obtained before construction notice to proceed is issued. However, due to the lack of adequate water volume and pressure, **sprinkler systems may not be feasible**. The facility shall comply with all other safety requirements of NFPA 101. In keeping with the intended function of these facilities, **handicapped accessibility will not be incorporated into this project**. Due to the war contingency requirement, it is assumed that only able-bodied military and civilian personnel will use the facilities listed herein.

### **3.2 Antiterrorism/Force Protection**

N/A

## **4. STRUCTURAL**

### **4.1 GENERAL**

The project consists of various structures. The new buildings shall be provided with a reinforced concrete slab foundation that is properly placed on suitable compacted ground area and shall be in accordance with the recommendations from the geotechnical investigation. The reinforced concrete foundation shall be designed by the Contractor.

### **4.2 DESIGN**

Design shall be performed and design documents signed by a registered professional architect and/or engineer. Calculations shall be in SI (metric) units of measurements. All components of the building shall be designed and constructed to support safely all loads without exceeding the allowable stress for the materials of construction in the structural members and connections.

### **4.3 DEAD AND LIVE LOADS**

Dead loads consist of the weight of all materials of construction incorporated in the buildings. Live loads used for design shall be in accordance with the American Society of Civil Engineers, ASCE STANDARD, and Minimum Design Loads for Buildings and Other Structures, ASCE 7, edition as referenced herein.

### **4.4 WIND LOADS**

Wind loads shall be calculated in accordance with ASCE 7 using a "3-second gust" wind speed of 125 km/hr. All facilities shall be classified as a minimum of Category II in accordance with Table 1-1 in ASCE 7, referenced herein.

### **4.5 SEISMIC**

The building and all parts thereof shall be designed for the seismic requirements as defined by the International Building Code referenced herein. Site-specific data: Not available, comply with the local data.

#### **4.6 STRUCTURAL CONCRETE**

Concrete structural elements shall be designed and constructed in accordance with the provisions of the American Concrete Institute, Building Code Requirements for Structural Concrete, ACI 318, latest edition. A minimum cylinder compressive strength of 3000 psi (21 mPa) shall be used for design and construction of all concrete. Reinforcing steel shall be deformed bars conforming to American Society for Testing and Materials (ASTM) publication ASTM A 615, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement. Concrete at or below grade shall have maximum water-cement ratio of 0.50. No concrete shall be placed when the ambient air temperature exceeds 32 degrees C (90 degrees F) unless an appropriate chemical retardant is used. In all cases when concrete is placed at 32 degrees C (90 degrees F) or hotter it shall be covered and kept continuously wet for a minimum of 48 hours. Concrete members at or below grade shall have a minimum concrete cover over reinforcement of 3" (75 millimeters).

#### **4.7 MASONRY**

Masonry shall be designed and constructed in accordance with the provisions of Building Code Requirements for Masonry Structures, ACI 530/ASCE 5/TMS 402, latest editions. Mortar shall be Type S and conform to ASTM C 270, latest edition. Masonry shall not be used below grade, unless for fully reinforced and grouted foundation stem walls.

#### **4.8 STRUCTURAL STEEL**

Structural steel shall be designed and constructed in accordance with the provisions of American Institute of Steel Construction (AISC), Specifications for Structural Steel Buildings, 9th Edition. Design of cold-formed steel structural members shall be in accordance with the provisions of American Iron and Steel Institute (AISI), Specifications for Design of Cold-Formed Steel Structural Members.

#### **4.9 METAL DECK**

Deck units shall conform to SDI Pub. No. 29. Panels of maximum possible lengths shall be used to minimize end laps. Deck units shall be fabricated in lengths to span three or more supports with flush, telescoped or nested 50 mm (2 inch) laps at ends, and interlocking, or nested side laps. Metal deck units shall be fabricated of steel thickness required by the design and shall be galvanized.

#### **4.10 OPEN WEB STEEL JOIST**

Open web steel joists shall conform to SJI Specifications and Tables. Joists shall be designed to support the loads given in the standard load tables of SJI Specifications and Tables.

#### **4.11 FOUNDATIONS**

Foundations shall be in accordance with the Geotechnical requirements of this RFP.

### **5. GEOTECHNICAL**

Existing geotechnical information is not available at the project site. Any site-specific geotechnical data required to develop foundations, materials, earthwork, and other geotechnical related design and construction activities for this project shall be the Contractor's responsibility. The Contractor shall develop all pertinent geotechnical design and construction parameters by appropriate field and laboratory investigations and analyses.



## **6. MECHANICAL**

### **6.1 GENERAL**

The work covered by this section consists of design, supply, fabrication and installation of new building heating, ventilation and air-conditioning (HVAC) systems. It also includes the delivery to site, erection, setting to work, adjusting, testing, balancing and handing over in perfect operating and running condition all of the HVAC equipment including all necessary associated mechanical works.

### **6.2 SPECIALIST SUB-CONTRACTORS QUALIFICATIONS**

The heating/ventilation and air-conditioning works shall be executed by an air-conditioning specialist sub-contractor experienced in the design and construction of these types of systems.

### **6.3 CODES, STANDARDS AND REGULATIONS**

The equipment, materials and works covered under the heating, ventilation and air-conditioning services shall conform to the referenced standards, codes and regulations where applicable except where otherwise mentioned under each particular clause.

### **6.4 DESIGN CONDITIONS**

#### **6.4.1 Outside Design Conditions**

Latitude – (approx.) 43 deg. 36' 16" North  
Longitude – (approx.) 51 deg. 13' 02" East  
Elevation – (approx.) Sea Level  
Summer - Comply with Local Data  
Winter – Comply with Local Data  
Daily Range – Comply with Local Data

#### **6.4.2 Indoor Design Condition**

Summer – 23.9 deg C (75 deg F) & 50% RH  
Winter – 21.1 deg C (70 deg F)

#### **6.4.3 Noise Level**

Noise levels inside occupied spaces generated by HVAC systems shall not exceed NC 35.

#### **6.4.4 Internal Loads**

- a. Occupancy: refer to Section 01010.
- b. Lighting (Fluor.): 21.5 W/m<sup>2</sup> (2 W/Ft<sup>2</sup>) maximum (however lighting levels shall meet minimum requirements)
- c. Outdoor Air: 34 CMH/Person (20 CFM) or “51 CMH/bedroom (30 CFM/bedroom)”; Latrine – 85 CMH/WC or Urinal (50 CFM) exhaust. Maintain negative pressure in latrine areas where mechanical HVAC is required.
- d. Building Pressurization: 1.3 mm W.G. (0.05 in W.G.)

### 6.4.5 Thermal Performance

Assemblies shall meet the requirements of TI-800, Design Criteria, UFC 3-400-01 Design: Energy Conservation, and ASHRAE Standard 90.1, latest editions, but shall meet the following minimum requirements:

<u>Assembly</u>	<u>Minimum Thermal Value</u>
exterior walls (above grade)	RSI 2.288 (R 13)
ceilings/roof	RSI 6.688(R 38)
basement wall	RSI
floor (over unheated space)	RSI 5.28 (R 30)
exterior doors	RSI 0.25 (R 1.43)
exterior windows/ (glazing within doors)	RSI 0.308(R 1.75)
Skylights	RSI 0.18 (R 1.02)

## 6.5 NEW AIR CONDITIONING EQUIPMENT

Heating/Refrigeration Equipment:

Environmental control of the facilities shall be achieved by HVAC equipment proposed by the contractor and approved by the U.S. Government. Cooling in the housing module shall be achieved using ductless-type split direct-expansion air conditioning units. Cooling in the toilet/shower module (as required) may be accomplished using ductless type split direct-expansion air-conditioning units or packaged air conditioning units (roof or perimeter mounted) however, any specifics within Section 01010 or elsewhere herein regarding heating and cooling requirements shall be adhered to. Heating shall be achieved by electric heating as part of the air-conditioner and/or supplemented by electric baseboard type convactor heating. Unless otherwise noted, the Contractor may choose any combination of equipment to achieve the inside design conditions specified for the floor plans.

### 6.5.1 Unitary (ductless split) DX Air Conditioning Units

Ductless split units shall be unitary in design and factory manufactured ready for installation. Provide two indoor units with a single condensing unit for each housing module. Evaporator unit shall consist of a DX evaporator cooling coil, blower, electric heater and washable filter all mounted in a housing finished for exposed installation. Cooling coil condensate piping shall route to and discharge to the sanitary sewer system. The condensing unit will contain compressor, condenser coil, and all internal controls/fittings complete to include a weatherized housing constructed and mounted on a 300 mm (12 inch) high steel stand on roof on the upper module. Copper refrigerant suction and liquid piping shall be sized, insulated and installed in accordance to unit manufacture recommendations. Unit temperature control shall include wall mounted adjustable thermostat, blower on-off-auto switch and heating-cooling change over control.

### 6.5.2 Packaged Terminal Air Conditioners

Packaged Terminal Air Conditioners shall be self-contained *thru-the-wall type* unit consisting of a completely self-contained, electrically operated unit, equipped with a factory assembled refrigeration system. The units shall consist of compressor, condenser, evaporator fans, motors, evaporator, heating and condenser coils/sections and all necessary appurtenances. The unit shall be provided with a

steel/metal sleeve or shall which can be permanently installed within the wall opening. The chassis of the unit shall be easily removable from the shell from inside the conditioned space. Adequate condenser air shall enter louvered openings. Provision of fresh air shall discharge through movable louvers. These units shall be mounted high on the wall to prevent infiltration of ground dust and in locations so as not to impede flow and function of the module.

### **6.5.3 Wall Penetrations**

Building wall penetrations shall be carefully made so as not to deteriorate the structural integrity of the wall system. The Contractor shall consult with the building manufacturer, if possible, to determine the best way to penetrate the wall. If the building manufacturer is not available, a structural engineer shall be consulted. In either case, the recommendations of the engineer shall be strictly adhered to.

### **6.5.4 Control Wiring and Protection Devices**

Control wiring and protection of the air conditioning units being offered must be the manufacturer's standard, pre-wired, installed in the unit at the factory or as recommended. Thermostats shall be located near the unit return. For units serving more than one area, the thermostat shall be located near the return of the space with the highest heat generation.

### **6.5.5 Air Filtration**

All supply air shall be filtered using manufacturer's standard washable filters mounted inside the unit. In addition, all outdoor air intakes where required shall be equipped with 50 mm (2 inch) thick washable filters.

### **6.5.6 Submittals**

The Contractor shall submit the following for the equipment to be provided under this section of the specification: manufacturer's data including performance characteristics at design conditions, dimensions, performance data, electrical requirements, and compliance with standards as stated in paragraph CODES, STANDARDS AND REGULATIONS; drawings indicating location of each piece of equipment, routing and size of refrigerant piping.

## **6.6 VENTILATION AND EXHAUST SYSTEMS**

All fans shall be used for building ventilation and pressurization with capacities to be selected for minimum noise level generated. Unit mounted fans either used for supply or exhaust shall be centrifugal forward curved, backward inclined, or airfoil fans with non-overloading characteristics of high efficiency and quiet running design. The fans shall be of the heavy-duty type with durable construction and proved performance in a desert environment. Each exhaust fan shall be provided with shut-off dampers which close automatically when the fan is not running. Also, each fan shall be complete with vibration isolator, external lubricators, and all accessories and sound attenuators as necessary.

### **6.6.1 Submittals**

The Contractor shall submit the following for the equipment to be provided under this section of the specification: manufacturer's data including performance characteristics at design conditions; catalog cuts showing dimensions, performance data, electrical requirements, compliance with standards as stated in paragraph CODES, STANDARDS AND REGULATIONS; drawings indicating location and installation

details.

## **6.7 NOT USED**

## **6.8 TEST ON COMPLETION**

**6.8.1** After completion of the work, the Contractor shall demonstrate to the Contracting Officer that the installation is adjusted and regulated correctly to fulfill the function for which it has been designed. The Contractor shall test, adjust, balance and regulate the section or sections of concern as necessary until the required conditions are obtained. Include tests for all interlocks, safety cutouts and other protective device to ensure correct functioning. All such tests shall be carried out and full records of the values obtained shall be prepared along with the final settings and submitted to the Contracting Officer in writing.

**6.8.2** The following tests and readings shall be made by the Contractor in the presence of the Contracting Officer and all results shall be recorded and submitted in a tabulated form.

a. Room Inside Conditions:

1. Inside room DB & WB temperatures
2. Air flow supply, return and/or exhaust

b. Air Handling Equipment: Air quantities shall be obtained by anemometer readings and all necessary adjustments shall be made to obtain the specified quantities of air indicated at each inlet and outlet.

Following readings shall be made:

1. Supply, return and outside air CMH (CFM) supplied by each air conditioning system.
2. Total CMH (CFM) exhausted by each exhaust fan
3. Motor speed, fan speed and input ampere reading for each fan
4. Supply, return and outside air temperature for each air-conditioning system.

c. Electric Motors:

For each motor: (1) Speed in RPM

(2) Amperes for each phase

(3) Power input in KW

## **6.9 ELECTRICAL REQUIREMENTS FOR HVAC EQUIPMENT**

a. Note that electrical requirements for all HVAC systems shall be designed and installed to operate on the secondary power standard required herein.

b. All thermostats shall be wall mounted near the return grilles in the room with the highest heat load generation and mounted 1.5 meters (5 feet) above the floor. In lieu of a thermostat, a temperature sensor may be located in the same location and connected to a thermostat located near the unit return.

Thermostat shall be mounted 1.5 meters (5 feet) above the finished floor and be easily accessible.

Thermostats for the latrine facilities shall be located near the unit return and mounted 1.5 meters (5 feet) above the finished floor. Operation of the control system shall be at the manufacturer's standard voltage for the unit.

c. The following are the minimum requirements for motors regarding enclosure, insulation and protection:

1. Compressor Hermetic: Provide inherent (internal) overload protection.
2. Condenser: Provide internal thermal overload protection.

3. Evaporator (Open Class "A") fan motor type provides internal thermal overload protection.

## **7. PLUMBING**

### **7.1 SYSTEM REQUIREMENTS**

Domestic water and waste systems shall be provided to each area with fixtures requiring water and/or waste connections such as toilets, etc. The entire water system shall include cold water to each fixture as well as to a water heater. Hot water shall be distributed to all lavatories, sinks, showers, etc. normally requiring hot water. Design of the water distribution and waste systems shall be in complete accordance with the requirements of the National Standard Plumbing Code (NAPHCC-01, latest edition). Design and construct a sewage tank system that can be converted into a lift station in the future. The Contractor shall design, furnish, install and test a domestic water supply system for each showers/latrines module (three for male and one female) as indicated on the drawing. Each supply system shall comprise of a booster pump, booster tank and water heater. Mechanical equipment shall be housed inside an insulated enclosure designed for year around operation and suitably protected from weather elements. Contractor shall design and install a domestic water tank system that can be easily converted to a permanent system in the future.

### **7.2 PIPING MATERIALS**

Domestic water shall be distributed by means of PVC (cold water only), CPVC (cold or hot water) or copper for the pressure to be utilized. PVC and CPVC shall not be used in areas where it will be exposed to outdoor sun.

### **7.3 FIXTURES**

All plumbing fixtures shall be provided with p-traps and shall be vented to the roof per International Plumbing Code, latest edition.

#### **7.3.1 Water Closet**

Unless noted otherwise, provide floor mounted, bottom discharge, white vitreous china elongated bowl with white seat and lid, flush tank type. Water supply shut-off valves shall be provided.

#### **7.3.2 Urinals**

If required, provide wall hung, rear discharge white vitreous china with flush valve.

#### **7.3.3 Lavatories**

Unless otherwise noted, lavatories shall be wall hung white vitreous china with hidden chair carriers, faucet and pop-up type drain. Faucets shall be chrome plated brass single lever mixing type.

#### **7.3.4 Water Heater**

Water heaters shall be electric storage type with either non-simultaneous dual element type. Water heaters shall be sized in accordance with the requirements of ASHRAE HVAC Applications Handbook, latest edition. Electrical service for water heaters shall be as required herein.

### **7.3.5 Insulation**

All domestic water piping exposed to weather shall be insulated and covered with metal jacketing.

## **8. FIRE PROTECTION**

### **8.1 GENERAL**

Facility construction and fire protection systems shall be installed in accordance with the publications listed herein and the publications referenced therein. Where a conflict occurs among various criteria, the more stringent requirement shall take precedence.

### **8.2 BUILDING CONSTRUCTION**

Building construction shall conform to fire resistance requirements, allowable floor area, building height limitations and building separation distance requirements of the building code.

### **8.3 LIFE SAFETY**

Facilities features will be provided in accordance with NFPA 101, among other references, to assure protection of occupants from fire or similar emergencies.

### **8.4 FIRE PROTECTION EQUIPMENT**

All fire protection equipment shall be listed by Underwriters' Laboratories (UL) or approved by Factory Mutual (FM) and shall be listed in the current UL Fire Protection Equipment Directory or Factory Mutual Approval Guide.

### **8.5 Hoisting Machines**

#### **8.5.1 "A"-Frame**

**8.5.1.1** "A" frame shall be a type tested and listed by a nationally recognized testing laboratory. The frame shall be tested for 125% of lifting capacity.

**8.5.1.2** Each hoist shall contain a name plate (s) stating:

- a) Manufacturer's name
- b) Maximum load rating
- c) Identification number
- d) Chain specification

### **8.6 NOT USED**

### **8.7 WATER SUPPLY FOR FIRE PROTECTION**

A dedicated fire protection water supply is unavailable.

### **8.8 PORTABLE FIRE EXTINGUISHERS**

Portable fire extinguishers shall be provided inside all facilities and at exterior locations as required in accordance with NFPA 10. Generally, extinguishers will be of the multi-purpose dry chemical type except for occupancies requiring a special type extinguisher (e.g., carbon dioxide portable fire extinguishers for electrical rooms).

## **9. ELECTRICAL**

### **9.1 GENERAL**

Contractor shall design and construct all electrical systems for the facilities. This includes design, construction, all necessary labor, equipment, and material 220/380 volt, 3-phase, 4 wire, 50 hertz. Design for a fully functional system. Secondary electrical distribution system shall be of the electrical system within facilities shall include, but is not limited to (a) interior secondary power distribution system, (b) lighting and power branch circuit and devices, and (c) fire detection and alarm system. All systems shall be designed for the ultimate demand loads, plus 25% spare capacity.

### **9.2 Design Criteria**

#### **9.2.1 Applicable Standards**

- a. Design shall be in the required units as stipulated herein.
- b. Conflicts between criteria and/or local standards shall be brought to the attention of the Contracting Officer for resolution. In such instances, all available information shall be furnished to the Contracting Officer for approval.
- c. All electrical systems and equipment shall be installed in accordance with NFPA code requirements.
- d. Acceptance Testing: Contractor shall develop and submit for approval complete acceptance test procedures on all systems provided. As a minimum the testing procedures shall comply with the requirements of NFPA 70 (NEC) and International Electrical Testing Association Inc. (NETA).
- e. Any other applicable references listed herein.

### **9.3 Material:**

#### **9.3.1 General:**

Unless noted otherwise, all material used shall be in compliance with the requirements of UL standard. In the event that UL compliant materials are not available, contractor may then select applicable IEC, DIN or British Standards (BS) listed material which equivalent to US standard.

Equipment enclosure types shall be in compliance with the National Electrical Manufacturer's Association (NEMA) or the International Electro-Technical Committee (IEC) standards. Material and equipment installed under this contract shall be for appropriate application

#### **9.3.2 Standard Product:**

All material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least two (2) years prior to bid opening.

**9.3.3 Design Conditions:** All equipment shall be rated and designed for 49 degrees Celsius (120 degrees Fahrenheit) and sea level.

**9.3.4 Restrictions:** Aluminum conductors shall not be specified or used.

## **9.4 Design Requirements**

### **9.4.1 Electrical Distribution System**

Contractor shall perform a load calculation to determine the number of required transformers to feed all facilities in this project. In the event the existing transformer(s), if present, cannot support the load of the entire facilities package, the contractor shall provide the required number of the new transformers. Design and installation of any additional feeders required from any ATS(s) will be the responsibility of the contractor. Contractor shall coordinate power needs with the Contracting Officer relative to needs met by each transformer, and to limit power interruption to other services already connected.

Generators shall be pad mounted within an enclosure rated for exterior use. An automatic transfer switch shall be provided for automatic transfer of power. Generators shall be sized for total electrical load plus twenty percent (25 %) spare capacity minimum. Fuel storage capacity shall be based on usage at total electrical load for a minimum of 7 days at full load for the entire duration. Fuel storage shall either be in aboveground single wall steel tank(s) with containment pit or underground double wall with leak detection. A day tank for each engine with storage for not less than 8 hours full load operation. Day tank may either be generator skid (sub-base) mounted or stand-alone unit. The contractor shall provide and install properly sized service entrance feeder from the generator system to the service entrance equipment located inside of each facility. Service entrance equipment shall include a distribution panel board properly sized to feed each facility.

Transformers shall be provided with back-up generators and Automatic Transfer Switches (ATS) by the contractor. The scope of work covered by this proposal begins at each ATS. The contractor shall provide and install properly sized service entrance feeder from each ATS to the service entrance equipment located inside of each facility. Service entrance equipment shall include a distribution panel board properly sized to feed each facility. Contractor shall coordinate with the Contracting Officer in locating the main distribution panel board(s) as close as possible to the corresponding ATS.

All panel boards shall be circuit breaker 'bolt-on' type panels. Minimum size circuit breaker shall be rated at no less than 20-amperes. Circuit breakers shall be connected to bus bar(s) within the panel boards. Daisy chain (breaker-to-breaker) connection(s) are not acceptable. Indoor distribution panels shall be flush mounted in finished areas and surface mounted in unfinished areas. All circuit breakers shall be labeled with an identification number corresponding to the panel schedule. A 3-pole circuit breaker shall be a single unit and not made up of 3 single pole circuit breakers connected with a wire or bridged to make a 3-pole breaker. All wiring shall be copper, minimum # 12 AWG (4 mm sq ) installed in metal conduit. Wiring shall be recessed in finished areas and surface mounted in unfinished areas. Flush mounted panels shall be provided with spare empty conduits from panel to unfinished area for future use. All panels shall be provided with a minimum of 25% spare capacity for future load growth. Power receptacles (outlets) shall be duplex type 220 V, 50 hertz and shall be compatible with the required secondary power. All splicing and terminations of wires shall be performed in a junction or device boxes. Proper wire nuts/connectors shall be used for splicing wire. No twist-wire connections with electrical tape wrapped around it shall be acceptable. All electrical installation shall be in accordance with NFPA 70 (National Electric Code). For large panels (225 Ampere and above) provide an ammeter, voltmeter and kilowatt-hour meter to monitor energy usage. Selector switch shall be provided for reading all 3 phases. Circuits shall be provided for all mechanical equipment and final connections made. Receptacle locations shall be coordinated with architectural requirements.



Contractor shall provide (design and install) circuits for all mechanical equipment and any other equipment that requires power and make the final connections.

#### **9.4.2 Lighting**

Design levels shall be per IES standards as a minimum. For convenience, the following lighting level table is listed. Note: all spaces listed below may not be within the work required within this contract.

Living room/Quarters	35 FC (350 Lux)
Toilets, Showers, Latrines	20 FC (200 Lux)
Mechanical/Electrical rooms	30 FC (300 Lux)
Corridors and Stairways	20 FC (200 Lux)
Offices (private)	50 FC (500 Lux)
Offices (open)	30 FC (300 Lux)
Kitchens (commercial)	50 FC (500 Lux)
Dining Areas	10 FC (100 Lux)
Auditoriums	20 FC (200 Lux)
Conference	30 FC (300 Lux)
Video Conference	50 FC (500 Lux)
Armories	30 FC (100 Lux)
Corridors	10 FC (100 Lux)
Worship (leader area)	30 FC (300 Lux)
Reading	50 FC (500 Lux)
Toilets and Washrooms	5 FC (50 Lux)
Patient Rooms (critical)	50 FC (500 Lux)
Egress path	1 FC (10 Lux)
Areas adjacent to egress path	1 FC (10 Lux)

FC = footcandle

Indoor lighting for all areas shall consist of fluorescent surface mounted light fixtures. Exterior lighting will be installed as referenced. Moisture resistant/waterproof fluorescent light fixtures shall be provided in high humidity and wet areas such as latrines and showers. Battery powered 'emergency' and 'exit' lights shall be provided within each building, as applicable, for safe egress during a power outage. All light fixtures shall be factory finished, complete and operational, to include but not be limited to, lens, globe, lamp, ballast etc. Industrial type fluorescent light fixtures shall not be used. Every room shall be provided with a minimum of one light switch. Light fixtures shall be mounted approximately 2.5-meters (8 feet) above finished floor (AFF), minimum. Fixtures may be pendant or ceiling mounted, depending on the ceiling type and height.

#### **9.4.3 Light Fixtures**

Lighting fixtures shall be a standard manufacturer's product. Fluorescent surface mounted light fixtures shall be power factor corrected and equipped with standard electronic ballast(s). All light fixtures shall properly operate using standard lamps available locally. Fixtures shall be fully factory wired and designed for appropriate application i.e. appropriate for that location where installed.

#### **9.4.4 Emergency "EXIT" Light Fixtures**

Emergency "EXIT" light fixture shall be provided in accordance with NFPA requirements. Fixtures shall be single side and for wall/ceiling mounting. Unit shall illuminate continuously and be provided with self-contained nickel cadmium battery pack, to operate on floated-battery or trickle charge circuit. Fixture shall operate satisfactorily for 90 minutes during a power outage. Unit shall have test/re-set and lamp failure indication buttons. Primary operating voltage shall be 220 volts. Lettering "EXIT" shall be color red and not less than 6 inches (150 mm) in height and on matte white background. Illuminations shall be with LEDs.

#### **9.4.5 Above Mirror Lights**

Above mirror lights shall be provided in toilet rooms.

#### **9.4.6 Emergency Lighting**

Battery powered emergency lights shall be provided within each building per NFPA for safe egress during power outage. Fixtures shall be provided with self-contained nickel cadmium battery pack to operate on stand-by circuit for 90-minute minimum. Unit shall have test/re-set and lamp failure indication buttons. Primary operating voltage shall be 220 volts.

#### **9.4.7 Light Switches**

Light switch shall be single pole. Minimum of one light switch shall be provided in every room. Lighting in large rooms/areas may be controlled from multiple switches. Three-way or Four-way lighting shall be provided in all rooms / areas with multiple entrances.

#### **9.4.8 Receptacles**

General-purpose receptacles shall be as required herein. Receptacles shall be placed at 3-meter (10 feet) intervals in general. Sinks will have a receptacle above, with one dual receptacle serving two sinks that are side-by-side. Receptacles in wet/damp areas or within 1 meter (~3 feet) of sinks, lavatories, or wash-down areas shall be ground fault circuit interrupter (GFCI) type or Residual Current Disconnect (RCD) type, with the trip setting of 10 milliamperes or less. Total number of duplex receptacles shall be limited to six (6) per 20-ampere circuit breaker.

#### **9.4.9 Conductors**

All cable and wire conductors shall be copper. Conductor jacket or insulation shall be color coded to satisfy local utility requirements.

#### **9.4.10 Grounding and Bonding**

Grounding and bonding shall comply with the requirements of NFPA 70. Underground connections shall be exothermal welded. All exposed non-current carrying metallic parts of electrical equipment in the electrical system shall be grounded. Insulated grounding conductor (separate from the electrical system neutral conductor) shall be installed in all feeder and branch circuit raceways. Grounding conductor shall be green-colored, unless the local authority requires a different color-coded conductor. Ground rods shall be copper-clad steel. Final measurement of the ground resistance shall be in compliance with the requirements of the local authority but shall not exceed 25 ohms when measured less than 48 hours after rainfall.

**9.4.11 Enclosures**

Enclosures for exterior and interior applications shall be NEMA Type 3R (IEC Classification IP54) and NEMA Type 1 (IEC Classification IP10), respectively.

**9.4.12 Fire Detection & Alarm System (Not Used)****9.4.13 Transient Voltage Surge Suppression (TVSS) (Not Used)****9.4.14 Conduit Raceway System**

Metal conduit system shall be complete, to include but not limited to, necessary junction and pull-boxes. Smallest conduit size shall be no less than 16mm (0.50 inch) in diameter. All empty conduits shall be furnished with pullwire. System design and installation shall be per NFPA 70 requirements. Exterior conductors shall be installed in PVC conduit at a depth of 48-inches.

**9.4.15 Cable Tray Raceway System (Not Used)****9.4.16 Identification Nameplates**

Major electrical equipment, such as transformers, panel boards, and load centers, etc. shall be provided with permanently installed engraved identification nameplates.

**9.4.17 Schedules**

All panel boards and load centers shall be provided with a panel schedule. Schedule shall be typed written in English.

**9.4.18 Single Line Diagram**

Complete single line diagrams shall be provided for all systems installed. All major items in each system shall be identified and labeled for respective rating. Single line diagrams for each system, installed in a clear plastic frame, shall be provided.

**APPENDIX**

Drawing and Photographs

See following pages.



N43.6055°

43.60444, 51.21722 (N43°Nēw Point)



N43.6035°

E51.2135°

E51.2145°

E51.2155°

E51.2165°

E51.2175°

E51.2185°

E51.2195°

E51.2205°

E51.22

N43.6025°

N43.6015°



© 2006 Europa Technologies  
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© 2006  
Google

Pointer lat 43.603091° lon 51.217453°

Streaming 100%

Eye alt 1918 ft



Naval Institute

N43.655°

N43.645°

Aqtan

N43.635°

Possible Site  
E51.145° E51.155° E51.165° E51.175° E51.185° E51.195° E51.205° E51.215° E51.225° E51.235°

N43.625°

N43.615°

N43.605°

43.60444, 51.21722

NewPoint



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© 2006  
Google

Pointer lat 43.628259° lon 51.192567°

Streaming |||||

55%

Eye alt 22538 ft



Pointer lat 43.640254° lon 51.168260°




Image © 2006 DigitalGlobe  
© 2006 Europa Technologies

N43.6325°  
Streaming 100%

Eye alt 13693 ft

© 2006  
Google

 Naval Institute

N43.6575°

N43.6525°

N43.6475°

N43.6425°

N43.6375°

N43.6325°

N43.6275°

E51.145°

E51.155°

E51.165°

E51.175°

E51.185°

E51.195°

Aqtan





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N43.6568°

N43.6563°

N43.6558°

43.65528, 51.16417

N43.6553°

N43.6548°

Naval Institute

E51.1625°

E51.1635°

E51.1645°

E51.1655°

E51.1665°

E51.1675°

E51.1685°

N43.6543°

N43.6538°

N43.6533°

N43.6528°





**Site Photo #1- Base Bid Item**



**Site Photo #2 – Optional Item**





**Site Photo #3 – Optional Item**



**Site Photo #4 – Optional Item**